

# Favorite Demonstration

## E-Concept Mapping

By Brian R. Shmaefsky

**N**ot all demonstrations involve using exciting visual displays of one or a series of scientific principles. Demonstrations can be as simple as showing the interrelationship between scientific concepts or principles using concept maps. Concept maps are tools that help people conceptualize and remember a conglomeration of facts making up complex topics or paradigms. They assist with factual retention while encouraging the use of facts in problem-solving activities. A concept map promotes creativity and flexibility because it places facts in the construct of the student's learning modality.

There are various ways of doing concept mapping. Many concept maps often involve images, words, and lines to represent the relationship between various facts and the overall topic or paradigm. The components of the concept map are arranged intuitively according to the importance of the concepts. In addition, they are organized into groupings, regions, or branches that indicate a particular level of relationship or divergence. It is important to have a uniform and consistent graphic or semantic structure of information to aid with recall of the information in the concept map.

### Background

Concept maps are not free-for-all diagrams of random thoughts about

how concepts fit together. They follow a pattern of organization that takes a scattering of facts and places them into a matrix that represents the underlying principle being taught.

**Step 1:** Start with the essential principle or topic at the center of the page. A student's mind focuses on the center of the page and views that information as being the primary or overarching idea (Figure 1).

**Step 2:** Do not be too rigid in how the concepts and terms are ordered or organized at first. Concept mapping starts out as a brainstorming of facts and terms relevant to the topic. The organization and interrelationship of these facts and terms comes later. At first, it is important to write down or draw the first things that come to mind when starting to think about the related facts and terms. Anything related to the central thought can be recorded whether they seem strange or unimportant.

**Step 3:** Free associate ideas as they emerge. Write one or two word descriptions of the ideas on lines branching from the central focus. Put down all ideas without judgment or evaluation. Permit an explosion of ideas to develop that can be translated and organized as the concept map evolves. Concepts can be translated into codes, images, symbols, or words if desired (Figure 2).

**Step 4:** Add relationships and connections that allow the ideas to expand outward into branches and sub-branches. Sometimes certain relationships and

connections are not immediately evident. Keep in mind that all concepts are not connected to the ideas of the central focus. Organization can always come later; the first requirement is to get the ideas from students onto the concept map surface.

### Materials

A computer with each of the following:

- Internet access
- Bookmark for Michigan State University C-Tool at <http://ctools.msu.edu/ctools/index.html>
- Bookmark for Freemind Software at [http://prdownloads.sourceforge.net/freemind/FreeMind-Windows-Installer-0\\_8\\_0-max.exe?download](http://prdownloads.sourceforge.net/freemind/FreeMind-Windows-Installer-0_8_0-max.exe?download)
- LCD project attached to computer
- Access to printer

### Procedure and inquiry

1. Tell students that you would like to do a quick review of the concepts associated with "Topic X".
2. Then go to Freemind or to the Michigan State University C-Tool website and add the concept map term "Topic X".
3. Solicit a few terms or concepts related to "Topic X" and then ask the class how the concepts are connected to each other. Use the "concept box" and "linking line" features to build a connecting line. Some concepts can be clumped together using branches or balloons that surround a subset of concepts.
4. Then ask students to justify the con-

**Brian R. Shmaefsky** (Brian.Shmaefsky@nhmccd.edu) is a professor of biology at Kigwood College in Kingwood, Texas.

- cept linking lines. Use the linking word or labeling feature to place student comments near the lines linking the concepts on the map.
- Continue the activity until you feel that students have made a comprehensive map.
  - The concept maps can then be printed and distributed to the class as a study resource.

### Assessment

The knowledge gained by concept mapping can be measured by asking students to identify the links between two or more concepts on a multiple-choice or matching examination. Students can form a concept map for a particular topic. They can also be asked to insert certain terms or concepts into an incomplete concept map.

### Conclusion

Concepts mapping is an old strategy for brainstorming in the corporate world and in the military. It is also a training tool used by educators, engineers, and psychologists for reinforcing memory, problem solving, and visual thinking. For faculty, the strength of the concept map is that it is a simple diagram used to represent words, ideas, tasks, or other items linked to and arranged around a central key word or idea. It is used to generate, visualize, structure, and classify ideas, and as an aid in study, organization, problem solving, and decision making.

### References

- Budd, J. 2004. Mind maps as classroom exercises. *Journal of Economic Education* 35 (1): 35–46.
- Buzan, T., and B. Buzan. 1993. *The mind map book: How to use radiant thinking to maximize your brain's untapped potential*. New York: Plume.

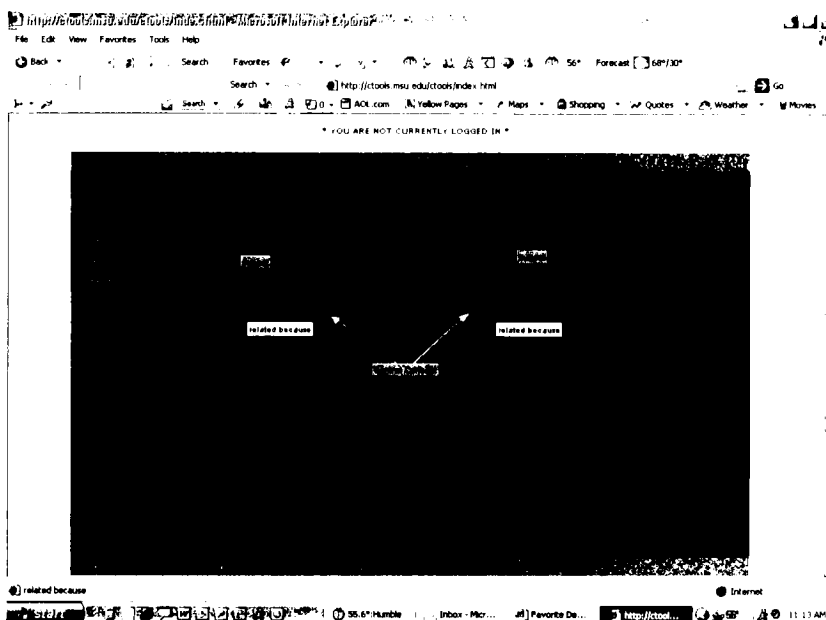
Chinnappan, M. 2003. Mathematics learning forum: Role of ICT in the construction of teachers' content knowledge schema. *Australian Journal of Educational Technology*

19 (2): 176–91.

Hyerle, D. 2000. *A field guide to using visual tools*. Alexandria, VA: Association for Supervision and Curriculum Development.

**FIGURE 1**

Screen capture of C-Tool concept map.



**FIGURE 2**

Freemind sample concept map for photosynthesis lecture.

